



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/990,964	11/21/2001	Andrew Roman Chraplyvy	Chraplyvy 28-16-5-3-1-7	3319
46363	7590	07/16/2008	EXAMINER	
PATTERSON & SHERIDAN, LLP/ LUCENT TECHNOLOGIES, INC 595 SHREWSBURY AVENUE SHREWSBURY, NJ 07702				LI, SHI K
ART UNIT		PAPER NUMBER		
2613				
			MAIL DATE	DELIVERY MODE
			07/16/2008	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	09/990,964	CHRAPLYVY ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Shi K. Li	2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 10 March 2008.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1,4-7,9-13,15 and 16 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1, 4-7, 9-13 and 15-16 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____ .
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)	5) <input type="checkbox"/> Notice of Informal Patent Application
Paper No(s)/Mail Date _____.	6) <input type="checkbox"/> Other: _____ .

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10 March 2008 has been entered.

### ***Claim Rejections - 35 USC § 103***

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1, 5, 7, 10-13 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atia et al. (W. Atia et al., "Demonstration of Return-to-Zero Signaling in Both OOK and DPSK Formats to Improve Receiver Sensitivity in an Optically Preamplified Receiver", IEEE Lasers and Electro-Optics Society 12<sup>th</sup> Annual Meeting, 8-11 Nov. 1999) in view of Clausen et al. (U.S. Patent 6,832,050 B1).

Regarding claims 1, 5, 10, 11, and 16, Atia teaches an apparatus adapted for use in transmission in an optical communication system, comprising: a modulator (see "phase modulator" of Fig. 1b) for modulating an optical phase of pulses within a sequence of return-to-zero (RZ) pulses (the sequence of RZ pulses is generated by the first "M-Z" modulator of fig. 1 b; see also 4th paragraph, second sentence: "The transmitter consists of a DFB laser externally modulated by a LiNbO<sub>3</sub> Mach-Zehnder that is sinusoidally driven to carve out RZ pulses") in accordance with an input digital data stream to form an optical phase modulated signal (see also

4th paragraph, third sentence: "These pulses [i.e. - the carved out RZ pulses] are subsequently modulated by another Mach-Zehnder to encode 10 Gb/s NRZ data), said modulator being one of phase shift keying (PSK), differential phase shift keying (DPSK), or quadrature phase shift keying (QPSK) modulator (this system is a DPSK arrangement - see e.g., title "...DPSK formats"). Atia does not expressly disclose that the optical transmission medium is dispersion managed. However, it is common and usually necessary to manage dispersion along an optical transmission medium. Clausen et al. teaches in FIG. 4 a transmission system comprising dispersion compensating devices (a) and (b). Device (a) is at the input of the transmission fiber, i.e., pre-dispersion compensation; and device (b) is at the output of the transmission fiber, i.e., post-dispersion compensation. Clausen et al. teaches in col. 3, lines 60-62 that it is advantageous to use short pulses. In particular, Clausen et al. teaches in col. 6, lines 1-5 to use pulses of 2.5 ps for a 40 Gb/s signal, i.e., a duty cycle of 10 %. One of ordinary skill in the art would have been motivated to combine the teaching of Clausen et al. with the transmission system of Atia because the method of Clausen et al. reduces timing and amplitude jitter in transmission of RZ modulated pulses. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use pre- and post dispersion compensation, as taught by Clausen et al., in the transmission system of Atia because the method of Clausen et al. reduces timing and amplitude jitter in transmission of RZ modulated pulses.

Regarding claim 7, the combined invention of Atia and Clausen et al. teaches that the medium is a long-haul transmission medium adapted for transmitting solitons (the medium is a fiber, which is adapted for transmitting solitons).

Regarding claim 12, the combined invention of Atia and Clausen et al. teaches that the apparatus further comprises a receiver including a delay demodulator for receiving the optical phase modulated signal from the dispersion managed optical transmission medium (note receiver of FIG. 1(b) of Atia; see also middle of 4th paragraph: "the receiver incorporates a Mach-Zehnder demodulator with a 1-bit time delay followed by a 10 GHz balanced detector").

Regarding claim 13, the combined invention of Atia and Clausen et al. teaches that the apparatus further comprises a balanced receiver for recovering said input data from the phase modulated signal (note receiver of fig. 1 b of Atia; see also middle of 4th paragraph: "the receiver incorporates a Mach-Zehnder demodulator with a 1-bit time delay followed by a 10 GHz balanced detector").

Regarding claim 15, the combined invention of Atia and Clausen et al. teaches a discrete or distributed means of erbium-doped fiber amplification or Raman amplification (see EDFA of fig. 1b).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atia and Clausen et al. as applied to claims 1, 5, 7, 10-13 and 15-16 above, and further in view of Ono et al. (U.S. Patent No. 6,097,525).

Regarding claim 4, the combined invention of Atia and Clausen et al. teaches the limitations of claim 1 but does not expressly disclose that the modulator is a PSK modulator. However, PSK modulation schemes are well known in the art, as is disclosed and illustrated by Ono (col. 8, lines 2-8; fig. 12) and are one of a plurality of modulation formats available to an artisan. A skilled artisan would have been motivated to use a PSK modulator in order to take advantage of the superiority in noise-proof capabilities characterized in PSK schemes. Therefore

it would have been obvious to a skilled artisan at the time of invention to use the PSK modulation technique of Ono in the modified system of Atia and Clausen et al. in order to allow transmission of healthier signals.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atia and Clausen et al. as applied to claims 1, 5, 7, 10-13 and 15-16 above, and further in view of Tzukerman et al. (U.S. Patent No. 6,724,829).

Regarding claim 6, the combined system of Atia and Clausen et al. teaches the limitations of claim 1 but does not expressly disclose that the modulator is a QPSK modulator. However, QPSK modulation is a modulation scheme well known in the art of data encoding and is one of a plurality of modulation formats available to an artisan. For example, Tzukerman discloses a QPSK modulator (314 of fig. 3, and col. 4, lines 56-57). It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate a QPSK modulator as indicated by Tzukerman in the modified system of Atia and Clausen et al. because QPSK modulation has the advantages of high spectral efficiency and low bit error rate (col. 4, lines 56-61).

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atia and Clausen et al. as applied to claims 1, 5, 7, 10-13 and 15-16 above, and further in view of Fukuchi (U.S. Patent 5,745,613).

Regarding claim 9, the combined system of Atia and Clausen et al. teaches the limitations of claim 1 but does not expressly disclose that the transmitter further includes a WDM to combine an output signal of the modulator with other phase modulated signals having optical carders with different wavelengths. However this structure is well known in the art. For example, Fukuchi teaches a WDM to combine an output signal of the modulator with other

modulated signals having optical carriers with different wavelengths (see fig. 1). It would have been obvious to a skilled artisan at the time of invention to multiplex several modulated signal together as indicated by Fukuchi in order to efficiently utilize the bandwidth in the transmission in the modified system of Atia and Clausen et al.

***Response to Arguments***

7. Applicant's arguments with respect to claims 1, 4-7, 9-13 and 15-16 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 571 272-3031. The examiner can normally be reached on Monday-Friday (7:30 a.m. - 4:30 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

skl  
14 July 2008

/Shi K. Li/  
Primary Examiner, Art Unit 2613